Childhood Adversity and Adult Health

Pierce County, 2004–2010

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Executive summary

- The purpose of this report is to examine the relationship between adverse experiences in early life and later health, to describe the prevalence of these experiences in Pierce County, and to stimulate discussion about how excessive stress can be prevented or how its effects might be mitigated.
- A large body of literature demonstrates that frequent activation of the neurochemical stress response, particularly when the brain is still developing (e.g. prenatally and during childhood), can have long-lasting deleterious effects on brain architecture and adult health.
- Adverse early life experiences thought to produce excessive stress include poverty, parental neglect, physical or sexual abuse, household disruption, and other physical or psychosocial threats.
- Early exposure to adversity seems to be a contributing cause of chronic disease in later life.

Adults with a history of childhood stress

- The average adult in Pierce County reported a history of 1.8 out of eight specific adverse childhood experiences assessed. About 30% reported three or more such experiences during childhood.
- We looked at demographic characteristics that are stable over the lifespan to try to identify risk factors for childhood adversity. Women, members of racial minority groups, and individuals reporting non-straight sexual orientation tended to have a history of more childhood adversity.
- The number of adverse childhood experiences was linearly related to several health outcomes including health-related activity limitation, fair or poor self-rated health, current asthma, history of cardiovascular disease or diabetes, and life dissatisfaction when demographic confounders were adjusted for.

Prenatal stress

- Over half of women who had given birth in Pierce County between 2004 and 2008 reported major stressful life events in the year prior to delivery. Prenatal stress has been linked to low birth weight and poor adult health outcomes.

Stress among children and youth

- About 2,700 Pierce County students attending public schools were homeless in the 2009-2010 school year.
- In 2010 about 40% of tenth graders in our county lived in poorly managed households—households in which caregivers provide little supervision or support.

Opportunities for prevention

- There are multiple, lifelong opportunities for chronic disease prevention, starting in the prenatal period:
  - Primary prevention—Provide safe, stable, supportive environments for pregnant women and children.
  - Secondary prevention—Identify families in which children are currently experiencing adversity and help them develop coping strategies.
• Tertiary prevention—Identify adults with a history of childhood adversity and promote social and biomedical strategies to mitigate their effects.
What is childhood adversity and why does it matter?

Stress is a psychosocial condition in which well-being is threatened and a physiological response, the so-called “fight or flight” response, is elicited. This complex, multi-faceted cascade of neuronal, hormonal and behavioral changes is the body’s internal alarm system. It prepares the body to protect itself in the face of immediate physical danger. Under many circumstances in modern society, however, the stress response can be maladaptive, particularly during development.

The national Scientific Council on the Developing Child identifies three grades of childhood stress:

- **Positive stress**, such as the first day attending a new school, is important for emotional development. It causes brief elevations in heart rate and small elevations in hormone levels.
- **Tolerable stress** is more severe and longer lasting. Examples might be the loss of a loved one or experiencing a single frightening event, occurring in an otherwise safe and supportive environment.
- **Toxic stress** is excessive. It occurs more frequently, more strongly, or from so many directions that a child’s ability to cope is overwhelmed. Toxic stress might result from chronic neglect, prolonged economic hardship or maltreatment from a caregiver.

Although studying the relationship between early life stress and adult well-being has a long history, the last two decades have brought a flood of research in this area. Both animal and human studies are converging on a single conclusion—that excessive stress in early life alters brain architecture and disrupts important regulatory systems in ways that influence physiology, behavior, and health throughout life. The growing national focus on health inequalities and on social determinants of health has shifted from simply describing these relationships to explaining them. Many look to the developmental response to stress as a possible explanatory principal underlying many health inequalities in our society.

The purpose of this report is to examine the relationship between adverse experiences in early life and later health, to describe the prevalence of these experiences in Pierce County, and to stimulate discussion about how excessive stress can be prevented or how its effects might be mitigated.

Is the association between childhood adversity and adult health causal?

Early childhood stress was recently put forward as a new and transformational way to frame health, disease prevention and pediatric practice. Such a paradigm shift can only be warranted if there is good evidence that the relationship between early childhood stress and adult health is causal. Below, we briefly review the evidence for a causal relationship, in the absence of randomized controlled studies in humans.
Does the outcome clearly occur before the exposure? Several prospective birth cohort studies that assessed adversity when participants were young and assessed health in adulthood have documented an association.8 9

Is the association strong? It is difficult to summarize the strength of association because different studies used different indicators of childhood adversity and different measures of adult health. Many life circumstances have been used to operationally define excessive childhood stress or adversity in epidemiological studies. These include, but are not limited to, low socioeconomic status, parental neglect, physical abuse, sexual abuse and social exclusion by peers.9 Childhood stress is associated with a wide variety of health outcomes including, but not limited to, psychiatric and substance use disorders,10 11 12 heart disease,13 14 obesity,15 diabetes and inflammation.16 9 It is important to remember that these relationships describe broad patterns observed in populations; they are not necessarily observable in all individuals exposed to childhood stress. A recent meta-analysis of 24 studies found a small to medium effect size relating childhood abuse and adult health.17

Can other, non-causal explanations be excluded? A third factor (a confounder) that causes both adversity and poor health could be responsible for the association. Some individual characteristics could plausibly work in this way. For example, if a child has poor impulse control, this could contribute to family disruption during childhood and also contribute to poor health outcomes in adulthood, independent of family disruption. Studies generally control for some confounding factors, but it is difficult to identify and control all possible factors.

Is there a plausible biological mechanism? Experimental studies in animals and observational studies in humans have demonstrated that prenatal or early life stress disrupts normal development and produces long-term changes in nervous, endocrine and immune systems.3 18 19 20 Studies have documented abnormal salivary stress hormone levels in individuals who had experienced maltreatment,21 sexual abuse,22 physical abuse,23 and poverty24 in childhood. This supports the idea that many different indices of adversity or stress are associated with dysregulation of the stress response later in life. This dysregulation, in turn, is thought to result in impaired ability of the body to respond to various challenges and higher wear-and-tear on regulatory systems, termed “allostatic load”.25 Allostatic load has been conceptualized as the cost of adapting to life’s vicissitudes. Impaired stress response resulting from childhood stress is not the only contributor to allostatic load. Stressful life experiences in adulthood, coping skills and genetic factors are also important.

Recent work is providing additional detail about these mechanisms. For example, in a prospective longitudinal study of a birth cohort, childhood exposure to violence was associated with accelerated telomere shortening at age 10.26 Telomeres are DNA sequences located at the ends of chromosomes. When cells divide, telomeres shorten; in time, the telomeres reach a critical length, and the cell loses its ability to replicate. This telomere shortening is thought to be related to aging and death. The association of telomere shortening and childhood stress is consistent with the early occurrence of age-related chronic disease among adults with a history of early life stress.
Does the outcome vary in a predictable way as the exposure varies? Studies have shown a graded relationship between the likelihood of a poor outcome and the number of childhood adverse experiences and with the severity of adversity. There are other ways this could be examined, for example, if a brain area is particularly vulnerable during a specific period during development, one would expect to find a relationship between the timing of adversity and the likelihood of health outcomes.

In this report we provisionally accept that early life stress may contribute to poor health outcomes in later in life. Our objectives are

1. To describe the prevalence of a history of childhood adversity among adults in our community and their relationship with health,
2. To examine the pathways that may mediate these effects if the relationship is causal, and
3. To describe the exposure to developmental stress in our community today that may influence population health in the future.

**Methods**

Our primary investigation of the relationship between childhood adversity and adult health used self-reported history of childhood adversity among adults in Pierce County. In addition, we describe some indicators of stress among pregnant women, children, and adolescents.

**Data sources**

*Washington State Department of Health, Center for Health Statistics, Behavioral Risk Factor Surveillance System (BRFSS)*, supported in part by Centers for Disease Control and Prevention, Cooperative Agreement U58 DP001996-1 through 2 (2009-2010). This survey of health conditions and behaviors sampled adults living in private residences with landline telephones. In 2009 and 2010 the Washington State BRFSS included an Adverse Childhood Experiences module designed to retrospectively assess childhood stress among adults. The module included 11 questions defining 8 types of adversity. The questions were derived from a more comprehensive tool used in previous studies. Responses were scored consistent with CDC publications. Question scoring was conservative: missing responses were coded as not having experienced the form of adversity.

*Pregnancy Risk Assessment Monitoring System (PRAMS)*, a survey of women who have recently given birth, included questions about pregnancy attitudes and behaviors. Between 2004 and 2008 the survey asked a number of questions that assessed maternal stress and abuse in the 12 months before giving birth.

*Healthy Youth Survey (HYS)* surveyed 6th, 8th, 10th and 12th grade students attending public schools on a variety of health beliefs and behaviors. There were no questions that were specifically included to assess stress or adversity. Therefore, we selected a subset of questions and scales that seemed to do so.
The specific questions used to assess stress in each of these populations are shown in the Results section of this report. Because the prevalence of stress depends on what questions are used, the values we report for youth, for pregnant women and for all adults should not be quantitatively compared.

*Washington State Office of the Superintendent of Public Schools* provided homelessness data for children attending public school in Pierce County.

**Statistical analysis**

We treated demographic characteristics that were present in childhood (race, gender, age and sexual orientation) as confounding variables because they may have contributed both to childhood stress and to adult health. Current age was, of course, not a childhood characteristic, but it can be interpreted as an unspecified environmental effect shared by members of the same birth cohort. If left uncontrolled, these variables could mask or exaggerate the degree of association between childhood adversity and adult health.

We used log-binomial or log-Poisson models to describe the relationship between the number of childhood stressors and health outcomes while adjusting for demographic confounders. BRFSS data were weighted for reporting county-level prevalence estimates, but unweighted data were used in regression analyses (Table 4).

We used Pierce County council districts to describe place of residence. District of residence was estimated using zip code information on the BRFSS. Zip code boundaries and council district boundaries were imperfectly aligned. When a zip code extended significantly into a second council district, respondents from that zip code were included in both council districts.

**How common is a history of childhood adversity among adults in our community?**

Childhood adversity is common among American adults, and may be particularly so in our area. In a 5-state study using the same BRFSS questions used in this report to assess childhood adversity, Washington State respondents reported significantly more childhood adversity than those from other participating states (Arkansas, Louisiana, New Mexico and Tennessee). In addition, a recent CDC study found a 42.6% lifetime prevalence of rape, violence or stalking by an intimate partner among women in Washington State. Just

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**BRFSS adverse childhood experience scale:**

1. Lived with anyone who was depressed, mentally ill or suicidal.
2. Lived with anyone who abused drugs or alcohol.
3. Lived with anyone who was incarcerated.
4. Parents divorced or separated.
5. Adults in household fought physically.
6. Physical abuse by adult.
7. Adult in household swore at you, insulted you or put you down.
8. Sexual contact with anyone 5 or more years older.
four states were higher. Witnessing such violence would be an adverse experience for children in these households.

In Pierce County, childhood experience with emotional abuse, substance abuse or divorce was reported by over 30% of respondents; having a household member in prison was reported infrequently (Figure 1). A history of childhood adversity was slightly more common in Pierce County than in Washington State. Adults in Pierce County reported having 1.8 adverse childhood experiences, on average; Washington State adults reported 1.7.

Figure 1 Percent of adults reporting specific childhood adversities, Pierce County, 2009-2010

Adverse experiences frequently clustered within individuals. Roughly one third of Pierce County adults reported having none of the eight adverse childhood experiences in the survey (Figure 2). Another third reported one or two adverse experience and the final third reported three or more forms of childhood adversity. The average number of adverse childhood experiences did not vary by place of residence within the county (Figure 3).
Figure 2 Percent of adults reporting adverse childhood experiences, Pierce County and Washington State

Figure 3 Percent of adults reporting three or more adverse childhood experiences among adults residing in different Pierce County Council districts, 2009-2010

What is the relationship between demographic factors and childhood adversity?

The focus in this section is on individual characteristics reported in adulthood that were also present in childhood and so might have contributed to the risk of childhood adversity. Of the demographic items on the BRFSS, only four, gender, birth cohort (age), race, and sexual orientation met this criterion.
Childhood adversity was significantly higher among women, non-white or Hispanic respondents and non-straight respondents (Table 1). We developed multivariable regression models to better understand how specific stressors contributed to these inequalities in adversity burden. When race, age and sexual orientation were held constant, women had experienced most forms of adversity in the same proportions as men. The notable exception was sexual abuse which was more than two times as common in women. Adults who were not straight in sexual orientation reported significantly more childhood adversity than their straight peers in many categories. This is consistent with more frequent parental maltreatment reported among homosexual adults in national studies. Non-white or Hispanic adults were more likely than their white non-Hispanic counterparts to have a family member in prison, to have witnessed adult violence as children and to have divorced parents.

Childhood adversity was related to age in a nonlinear fashion. The oldest respondents reported childhood adversity least frequently; the highest prevalence was among middle-aged respondents. Age is, in part, a reflection of birth cohort and broad social environment in place during the years of childhood. Parental divorce, for example, was reported less frequently in the oldest age group, perhaps because divorce was not socially acceptable in the years when these respondents were young. The freedom from childhood adversity in the oldest group could be a result of forgetting negative experiences or of older individuals’ reluctance to disclose this kind of information. Yet another explanation is that older survey respondents comprise a biased sample of the original birth cohort because those with the highest adversity burden were more likely to be ill or dead than the responding survivors.

Table 1 Relationship between childhood adversity and demographic characteristics, Pierce County, 2009-2010

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N</th>
<th>Average number of adverse childhood experiences</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>818</td>
<td>1.66</td>
<td>1.49–1.84</td>
</tr>
<tr>
<td>Female</td>
<td>1283</td>
<td>1.97</td>
<td>1.81–2.13</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White non-Hispanic</td>
<td>1779</td>
<td>1.77</td>
<td>1.65–1.90</td>
</tr>
<tr>
<td>Non-white or Hispanic</td>
<td>303</td>
<td>2.11</td>
<td>1.80–2.42</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-34</td>
<td>247</td>
<td>1.95</td>
<td>1.67–2.23</td>
</tr>
<tr>
<td>35-44</td>
<td>289</td>
<td>2.00</td>
<td>1.76–2.24</td>
</tr>
<tr>
<td>45-54</td>
<td>424</td>
<td>2.07</td>
<td>1.85–2.29</td>
</tr>
<tr>
<td>55-64</td>
<td>503</td>
<td>1.71</td>
<td>1.54–1.88</td>
</tr>
<tr>
<td>65+</td>
<td>638</td>
<td>1.09</td>
<td>0.95–1.24</td>
</tr>
<tr>
<td>Sexual orientation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Straight</td>
<td>2017</td>
<td>1.79</td>
<td>1.67–1.90</td>
</tr>
<tr>
<td>Gay, bisexual or other</td>
<td>47</td>
<td>3.14</td>
<td>2.23–4.04</td>
</tr>
</tbody>
</table>
What is the association between childhood adversity and selected health and social outcomes?

In Pierce County, there was a direct relationship between the number of adverse childhood experiences and various health outcomes, including poor general health, current asthma, activity limitation due to health and life dissatisfaction (Table 2). For example, activity limitation due to poor health was reported by 18% of adults with no history of adversity, 25% of adults with one or two adverse experiences and 34% of adults with three or more adverse experiences. Adverse childhood experiences were also linearly associated with the number of days of poor mental health, poor physical health, and days of limited activity in the past month (Table 3).

Table 2 Percent with selected health outcomes, by number of adverse childhood experiences, Pierce County, 2009-2010

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Number of adverse childhood experiences</th>
<th>p for trend*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 (n=792)</td>
<td>1 or 2 (n=714)</td>
</tr>
<tr>
<td>Activity limitation due to physical, emotional or mental problems</td>
<td>18.06</td>
<td>25.35</td>
</tr>
<tr>
<td>General health rated fair or poor</td>
<td>11.22</td>
<td>14.66</td>
</tr>
<tr>
<td>Ever diagnosed with diabetes</td>
<td>9.94</td>
<td>9.75</td>
</tr>
<tr>
<td>Ever diagnosed with angina, coronary artery disease, heart attack or stroke</td>
<td>7.94</td>
<td>6.32</td>
</tr>
<tr>
<td>Currently diagnosed with asthma</td>
<td>7.34</td>
<td>8.54</td>
</tr>
<tr>
<td>Dissatisfied or very dissatisfied with life</td>
<td>2.42</td>
<td>6.32</td>
</tr>
</tbody>
</table>

*number of adverse experiences was treated as continuous variable

Table 3 Average days out of previous 30 in which health was not good, by number of adverse childhood experiences, Pierce County, 2009-2010

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Number of adverse childhood experiences</th>
<th>p for trend*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 (n=792)</td>
<td>1 or 2 (n=714)</td>
</tr>
<tr>
<td>Days physical health not good</td>
<td>2.42</td>
<td>3.94</td>
</tr>
<tr>
<td>Days mental health not good</td>
<td>2.01</td>
<td>3.71</td>
</tr>
<tr>
<td>Days activity was limited due to physical or mental health</td>
<td>3.92</td>
<td>4.09</td>
</tr>
</tbody>
</table>

*number of adverse experiences was treated as continuous variable
Table 4 shows the increase in likelihood of a health outcome associated with having one additional adverse experience. For example, on average, about 2.4% adults with 0 adverse experiences reported dissatisfaction with life (Table 2). In unadjusted analysis, adults with 1 adverse experience would be 34.3% more likely to report life dissatisfaction. Note that this indicates a percent increase (i.e. from 2.4% to 3.2%), not a percentage point increase (i.e. from 2.4% to 36.7%). Adults with 2 adverse experiences would be 34.3% more likely than those with 1 such experience to report life dissatisfaction, and so on.

The unadjusted values in Table 4 and Tables 2 and 3 might underestimate the impact of childhood adversity on health in our county. Older adults reported fewer adverse experiences in childhood than did younger adults, so individuals reporting few adverse childhood experiences will be disproportionately older, and because they are older, will tend to report poorer health. This may give the appearance that childhood adversity and poor adult health are not related, or are even inversely related. The association, however, would not be because of a causal relationship between adversity and health, but because of how these variables are related to age. The relationship between adversity and health, independent of the contribution of age can be estimated through a statistical process called adjustment.

When age and other childhood demographic characteristics were adjusted for, the relationship with childhood adversity became stronger for several outcomes (Table 4). For example, when age, sex, race and sexual orientation were ignored, having one additional adverse experience increased the prevalence of cardiovascular disease by 5%. When these demographic factors were adjusted for, this increased to a 12%.

Table 4 Increase in prevalence of poor outcome associated with one additional adverse experience in the sample, Pierce County, 2009-2010

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Unadjusted</th>
<th>95% CI</th>
<th>Adjusted for demographic characteristics*</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissatisfied or very dissatisfied with life</td>
<td>34.3</td>
<td>25.9–43.3</td>
<td>32.7</td>
<td>24.0–42.1</td>
</tr>
<tr>
<td>Currently diagnosed with asthma</td>
<td>18.1</td>
<td>12.0–24.6</td>
<td>14.0</td>
<td>7.9–20.4</td>
</tr>
<tr>
<td>General health rated fair or poor</td>
<td>11.6</td>
<td>1.1–16.4</td>
<td>15.1</td>
<td>10.5–19.5</td>
</tr>
<tr>
<td>Activity limitation due to physical, emotional or mental problems</td>
<td>12.1</td>
<td>9.2–15.1</td>
<td>13.3</td>
<td>10.6–15.9</td>
</tr>
<tr>
<td>Ever diagnosed with angina, coronary artery disease, heart attack or stroke</td>
<td>5.1</td>
<td>0–11.6</td>
<td>12.4</td>
<td>5.0–20.2</td>
</tr>
<tr>
<td>Ever diagnosed with diabetes</td>
<td>2.3</td>
<td>0–8.3</td>
<td>6.6</td>
<td>0.7–12.8</td>
</tr>
</tbody>
</table>

*Age (5 categories), sex, race (2 categories) and sexual orientation (2 categories)
Is there an association between the prevalence of behavioral risk factors and a history of childhood adversity?

For this analysis, we considered four health behaviors: smoking, heavy drinking (two or more daily drinks for men; one or more for women), obesity, and leisure physical activity. The prevalence of obesity and smoking increased with increasing levels of childhood adversity, while heavy drinking and no leisure exercise did not (Figure 4).

![Figure 4 Prevalence of selected risk behaviors, by number of adverse childhood experiences, Pierce County, 2009-2010](image)

What additional factors might mediate or moderate the relationship between childhood adversity and adult health?

Life course epidemiological studies suggest that the deleterious effects of childhood adversity can be blunted or aggravated by environmental exposures later in life.

In Pierce County, higher adult income seemed to buffer the impact of childhood adversity for some, but not all health outcomes. For example, both high and low income adults exhibited a graded relationship between the number of adverse childhood experiences and prevalence of fair or poor health (Figure 5). But within each category of adversity the low-income respondents were more likely than the high-income respondents to report fair or poor health. There was a similar pattern for adults reporting activity limitations due to health (Figure 6).
Figure 5  Percent of adults reporting general health as “fair” or “poor”, by childhood adversity and income, Pierce County, 2009-2010

Figure 6  Percent of adults reporting activity limitation due to physical, mental or emotional problems, by childhood adversity and income, Pierce County, 2009-2010
How common is early life adversity in our community?

**Stress during pregnancy**
Pregnancy can be a particularly difficult time for families, particularly if there is ambivalence about the upcoming birth. Maternal stress during pregnancy is important because maternal stress hormones cross the placenta and so affect the developing fetus. Prenatal exposure to excess stress hormones is thought to result in low birth weight and later disease risk.35

In Pierce County, stress during pregnancy was common. More than three out of four women reported experiencing at least one of 13 possible stressful life events in the 12 months before the birth of their babies (Table 5). Seven percent reported six or more such events. These factors may have contributed to the 5% rate of low birth weight births we see in our county every year.

**Table 5** Percent of women experiencing stress in the 12 months before giving birth, Pierce County, 2004-2008

<table>
<thead>
<tr>
<th>Number of stressful events</th>
<th>N</th>
<th>Percent</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>23.7</td>
<td>19.9–24.5</td>
<td></td>
</tr>
<tr>
<td>1-2</td>
<td>46.8</td>
<td>42.3–51.4</td>
<td></td>
</tr>
<tr>
<td>3-5</td>
<td>22.6</td>
<td>18.8–26.3</td>
<td></td>
</tr>
<tr>
<td>6-13</td>
<td>6.9</td>
<td>4.7–9.2</td>
<td></td>
</tr>
<tr>
<td>Ate less than desired because of cost</td>
<td>793</td>
<td>10.6</td>
<td>7.9–13.3</td>
</tr>
<tr>
<td>Upset due to race discrimination</td>
<td>804</td>
<td>6.3</td>
<td>4.4–8.2</td>
</tr>
<tr>
<td>Physical abuse by current or former partner</td>
<td>802</td>
<td>2.9</td>
<td>1.5–4.3</td>
</tr>
</tbody>
</table>

**Indicators of stress during pregnancy**

**PRAMS stress scale:**
1. Hospitalization of a close family member
2. Separation or divorce
3. Moving to a new place of residence
4. Homelessness
5. Husband/partner lost job
6. Woman lost job
7. More arguments with husband/partner
8. Husband/partner didn’t want pregnancy
9. Unpaid bills
10. In a physical fight
11. Husband/partner or woman went to jail
12. Substance abuse by someone close
13. Death of someone close

**Additional indicators:**
- Physical abuse by current or former husband/partner
- Ate less because there wasn’t enough money
- Experienced racial discrimination
Stress during childhood and adolescence
Unfortunately, indicators of adversity were also common among children in Pierce County. About 300 additional children attending public schools in Pierce County became homeless as a result of the economic recession in 2008, bringing the total to about 2,700 (Figure 7). This is about 2% of all children in public schools.

Figure 7 Number of homeless children attending public school, Pierce County

<table>
<thead>
<tr>
<th>Indicators of stress among adolescents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HYS poor family management scale:</strong></td>
</tr>
<tr>
<td>1. My parents ask if I’ve gotten my homework done.</td>
</tr>
<tr>
<td>2. When I am not at home, one of my parents knows where I am and who I am with.</td>
</tr>
<tr>
<td>3. The rules in my family are clear.</td>
</tr>
<tr>
<td>4. My family has clear rules about alcohol and drug use.</td>
</tr>
<tr>
<td>5. If you drank some beer, wine, or liquor without your parents’ permission, would you be caught by them?</td>
</tr>
<tr>
<td>6. If you carried a handgun without your parents’ permission, would you be caught by them?</td>
</tr>
<tr>
<td>7. If you skipped school, would you be caught by your parents?</td>
</tr>
<tr>
<td>8. Would your parents know if you did not come home on time?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional indicators:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Ever physically abused by an adult.</td>
</tr>
<tr>
<td>• Not counting TV, movies, video games and sporting events, ever seen an adult hit, slap, punch, shove, kick, or otherwise physically hurt another adult more than one time.</td>
</tr>
<tr>
<td>• Bullied in the last 30 days.</td>
</tr>
<tr>
<td>• Made to feel unsafe by a boyfriend or girlfriend last 12 months.</td>
</tr>
<tr>
<td>• Cut meal size or skipped meals because of cost last 12 months.</td>
</tr>
</tbody>
</table>
About 40% of 10th graders were living in families where parental management was poor (Figure 8). In these families, parental control is loose or absent; parents are not engaged in their child’s development. Almost a quarter of adolescents had been bullied by a peer. Nineteen percent had experienced food insecurity in the last year. The values of all the adolescent indicators remained stable between 2002 and 2010.

![Figure 8 Percent of 10th graders reporting selected adverse experiences, Pierce County, 2010](image)

**Concluding remarks**

It is both startling and self-evident that abnormal developmental experiences can have life-long consequences. Startling because we want to believe in a world in which our own agency, not our history, determines our life course. Self-evident because we see again and again that certain subgroups in our population are especially vulnerable, whatever the health or social outcome, even when traditional risk factors are accounted for. We think about primary disease prevention in terms of health behaviors such as diet and exercise. Primary disease prevention actually begins with experiencing a normal prenatal environment and a safe, stable childhood.

This cannot be achieved through health care alone. It is well-known that the U.S. has unusually high health care expenditures yet ranks below some developing countries in indicators of population health. A recent ecological analysis suggests that some important population health indicators—infant mortality, life expectancy and years of potential life lost—are more closely associated with social services spending than health services spending, adjusting for GDP. This
supports the idea that physical health is a reflection of the cumulative insults inflicted by life experience.

Although it is beyond the scope of this report to evaluate interventions that might prevent childhood adversity and its consequences, three levels of prevention seem plausible:

- **Primary prevention**—Provide safe, stable, supportive environments for pregnant women and children.
- **Secondary prevention**—Identify families in which children are currently experiencing adversity and help them develop coping strategies.
- **Tertiary prevention**—Identify adults with a history of childhood adversity and promote social and biomedical strategies to mitigate their effects.
References


6 Committee on psychosocial aspects of child and family health, Committee on early childhood adoption and dependent care, Section on developmental and behavioral pediatrics. Early childhood adversity, toxic stress and the role of the pediatrician: translating developmental science into lifelong health. Pediatrics 2012;129:e224-e231.


8 Kuh D Hardy R Langenberg C et al. Mortality in adults aged 26-54 years related to socioeconomic conditions in childhood and adulthood: post war birth cohort study. BMJ 2002;325:1076


